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THE AMPHIBIA, REPTILE AND MAMMAL FAUNA OF THE MURRAY — SERPENTINE RIVER DELTA, SOUTH WEST, WESTERN AUSTRALIA

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INTRODUCTION

The Murray — Serpentine River delta (32° 34' 50"S. lat. 115° 46' 00"E long.) is located 110km south of Perth. The eight islands in the delta (Figure 1) make a total area of approximately 400 hectares and are all vested in the Shire of Murray as a "National Park" (1932). Over the last 20 years the Western Australian Naturalists' Club has conducted a number of excursions to the area recording natural history data. The only published information are Serventy (1970) and Hutchison (1972). Because of the lack of information on the terrestrial vertebrate fauna of this, the only typical, delta on the Western Australian coast we undertook a survey to determine the composition, relative abundance and habitat preferences of the various species. The climate of the delta system is characterised by hot dry summers and cool wet winters (McArthur and Bartle 1980). The nearest climatic data is available from Mandurah which is approximately 8km north-west, where the mean annual rainfall is 891mm and the mean maximum and minimum temperatures are 23° and 12°C. respectively. The coastal plain has wet winters that can cause extensive inundations on the islands forcing some components of the terrestrial fauna to move to higher areas or perish. However, in dry summers all areas are readily accessible.

METHODS

Mammals, amphibians and reptiles were collected on the delta islands during 1986 on a seasonal basis. Duration of these surveys were as follows: Summer: 14-17 February, Autumn: 20-27 April, Winter: 23-31 August, Spring: 22-28 November, Summer: 13-19 December.

Mammals were sampled by the use of Elliott and cage traps and by observations and talking to local residents. Collecting of amphibians and reptiles involved active searching during day time, turning over surface debris, raking through leaf litter and head torching at night for nocturnal species. Appendix III shows the number of species recorded on each island.

Six traplines were installed on Culeenup, to sample the main vegetation associations (Appendix I). Traplines consisted of a 0.3 metre high, 50 metre long drift fence with five pit traps. The latter were made from P.V.C. tubing, 0.6 metres deep and 0.15 metres in diameter. The traps were operated for a total of 708 trap nights. Appendix II shows the number of species caught at each trapline.

All mammals were identified and released at area of trapping. Voucher specimens of amphibians and reptiles were lodged with the Western Australian Museum. The remainder were identified and released. The Museum collection data was examined to obtain information on species that were not recorded during our survey.

During the course of our study we sampled several vegetation associations on Culeenup Island. This island, the largest in the delta, has representative examples of the major associations in the delta system. Generally these associations reflect height above the water table.

The higher part of the island consists mainly of open *Eucalyptus nudis* woodland. This merges into a mixed community of *Acacia saligna*, *Jacksonia furcellata*, *J. stembergiana*, *Viminaria juncea* and *Melaleuca* spp. which can be very dense in places. Towards the west, where lower lying soils prevail, ephemeral swamps and lakes occur. The fringing low shrubbery here consists of samphires (chenopodiaceous genera) and *Melaleuca* spp. which are the dominant littoral trees. At the western end of the island salt marshes interspersed with channels are the main feature. Due to the salinity, halophytic plants are a major component, as they are adapted to soils of both a high salt content and of wide seasonal fluctuations in soil water content (Smith 1985). The island is delineated by two channels (Figure 1). The channel banks are stabilised by *Casuarina obesa* and *Melaleuca raphiophylla*. The herbaceous understorey is similar to that in other parts of the coastal plain. However, the introduced species *Chasmanthe floribunda* is aggressively covering large parts of the island and thereby causing the retreat of the native components.

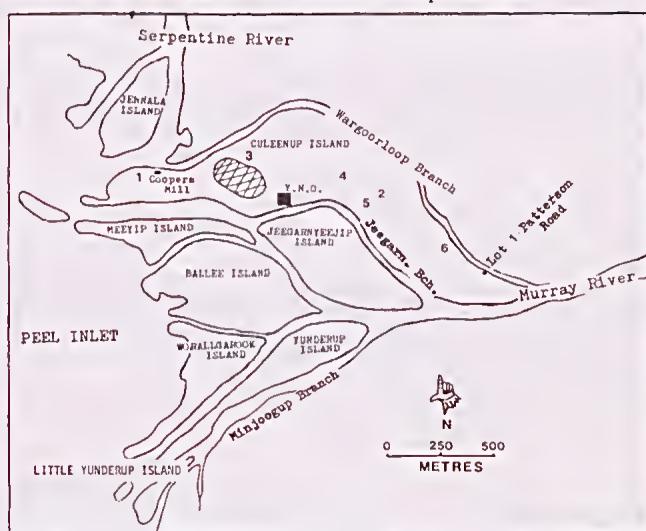


Figure 1. Murray — Serpentine Delta showing location of islands in delta, trapline localities (1-6), ephemeral lake (cross-hatching) and Yunderup Nature Observatory (Y.N.O.)

RESULTS
ANNOTATED LISTS

MAMMALS

Western Grey Kangaroo (*Macropus fuliginosus*)

Two sightings on Culeenup Island; an adult male observed on 22 April at 0830 hrs near trapline 3 and a group of three on 31 August on an ephemeral saltlake. Evidence of this animal was found on Jeegarnyeejip Is., Yunderup Is., Ballee Is., and Worallgarook Is. Local residents informed us that they move from island to island.

Brush-tailed Possum (*Trichosurus vulpecula*)

Not recorded by us. Local residents report intermittent observations on Wargoorloop Branch feeding in *Eucalyptus nudis* and also in the roof of a residential building on Lot 1 Patterson Road throughout the year (Ken Tatham, pers. comm.).

Southern Brown Bandicoot (*Isodon obesulus*)

In December a sub-adult female was pit-trapped (Trapline 1). A single bandicoot dropping was also found in December on the northern side of Culeenup Is., which was identified by the Dept. of Mammals at the W.A. Museum. Their current scarcity is probably due to the presence of the introduced cat and fox. During the 1920s-1930s *I. obesulus* was relatively common on Culeenup Is. (Bruce Tatham, pers. comm.).

Water Rat (*Hydromys chrysogaster*)

In December an adult male was caught in a cage trap on the jetty at Lot 1 Patterson Road by Ken Tatham who commonly observes them in the delta system on banks of Murray River and channels.

White-striped Mastiff Bat (*Tadarida australis*)

Heard and observed flying over Jeegarnyeejip Branch and adjacent nature observatory in November and December.

House Mouse (*Mus musculus*)

During our survey 20 animals were trapped on Culeenup Is. Also recorded on Jeegarnyeejip Is. and Yunderup Is. in November.

Black Rat (*Rattus rattus*)

One adult caught in Elliott trap among samphire vegetation on periphery of ephemeral saltlake in April and one sub-adult male caught in Trapline 1 in December.

European Rabbit (*Oryctolagus cuniculus*)

Rabbits occur throughout the delta system, and most were seen in the open woodland and grassland areas on Culeenup Is. Attempts by the Agriculture Protection Board to eradicate them were partially successful, but no data are available. Local residents informed us that there has been a definite decline in rabbit numbers on the island since baiting.

Domestic Sheep (*Ovis aries*)

In August 1985 a sheep was observed adjacent to the ephemeral saltlake. During this survey the remains of two more were found on Culeenup Is.

Cat (*Felis catus*)

Two were observed on Culeenup Is. in November and December respectively and one on Jeegarnyeejip Is. in November.

Fox (Vulpes vulpes)

One observed near Trapline 3 in February and another seen on Jennala Is. in December. Evidence of scats and lairs are widespread.

AMPHIBIANS

Leptodactylidae:

Crinia georgiana

Not recorded by us. The W.A. Museum holds one specimen (R:41515) collected by D.L. Serventy on October 1972 from Culeenup Is.

Heleioporus eyrei

Three trapped in February, two in April, 11 in August, 110 in November and 66 in December. Most specimens were pit-trapped in open woodland and grassland habitats. Many were seen at night while headtorching in the November and December surveys.

Limnodynastes dorsalis

Not recorded by us. Mrs D.E. Trainor found a frog in her boat on Yunderup Is. in September 1986. The description she gave was identical to this species.

Neobatrachus pelobatoides

An adult pit-trapped at Trapline 6 in August.

Pseudophryne guentheri

One trapped in February, 11 in August, 152 in November and 200 in December. Most were pit-trapped in open woodland and grassland habitats. Some were collected in daytime beneath surface debris.

Ranidella insignifera

One trapped in February, 5 in April, 26 in August, 190 in November and 38 in December. Very abundant during the winter survey, many more seen in inundated areas. Sub-adults were subsequently pit-trapped in spring.

Hylidae:

Litoria moorei

One trapped in February, four in August, eight in November and one in December. Heard calling during the mid year part of our survey and some were seen at night while headtorching; six adults were active on recently watered lawn in November.

REPTILES

Cheluidae:

Chelodina oblonga

Not recorded by us. Mr G. Elliott (W.A. Nats. Club member) found a juvenile in a water filled trench on Culeenup Is. in September 1984. They have been seen in most tributaries during the winter months, most sightings from Minjoogup Branch (Bruce Tatham, pers. comm.).

Gekkonidae:

Phyllodactylus marmoratus

One caught in February, four in August, seven in November and four in December. Mainly found on, and around man-made habitats; one specimen pit-trapped at trapline 6. A gravid female had two eggs in November and another in December.

Pygopodidae:

Aprasia repens

One caught in February, two in April and four in August. All were excavated from soil beneath decaying logs and man-made debris in open shrubland areas.

Lialis burtonis

One caught in April, one in November and seven in December. Two were found active with the remainder being pit-trapped. Five specimens found in November and December were gravid females.

Agamidae:

Pogona minor

An adult pit-trapped at trapline 2 in November.

Scincidae:

Cryptoblepharus plagiocephalus

Eight caught in February, 27 in April, 52 in August, 20 in November and 19 in December. Recorded from all islands in delta system. Commonly observed where *Casuarina obesa* and *Eucalyptus rudis* are the dominant trees. Also pit-trapped and collected on man-made structures.

Ctenotus impar

Six trapped in February, seven in April, one in August, 19 in November and seven in December. Most specimens were pit-trapped or collected by hand where *Conostylis aculeata* was the main ground cover. Some were found beneath man-made debris.

Egernia kingii

One trapped in February, 20 in April, six in August, 15 in November and 11 in December. Recorded from all islands in delta system. Observed in all habitats including man-made and also beneath trash. Two were caught in Elliott traps on Culeenup Is. in November and four on Jeegarnyeejip Is. in December.

Leiopisma trilineatum

Three trapped in February, 16 in April, 40 in August, 29 in November and 26 in December. Recorded from all islands in delta system except Little Yunderup and Jennala. Commonly pit-trapped and observed active among low vegetation including samphire varieties.

Lerista elegans

Two caught in February, one in April, two in August, eight in November and five in December. Pit-trapped and also found in daytime in open woodland and shrubland habitats with *C. aculeata* being the main ground cover.

Menetia greyii

Seven caught in February, 12 in April, 14 in August, 47 in November and 21 in December. Common throughout islands on which recorded. It is interesting to note the number of specimens (approx. 40-50%) found during the February, April, November and December surveys with distinct yellow bellies. Storr (1976) makes no mention of this, rather that the ventral surfaces are immaculate or pale.

Tiliqua rugosa

Two caught in February, two in April, one in August, five in November and five in December. Sparsely distributed throughout the delta system. Specimens were pit-trapped, observed active and found beneath man-made debris.

Varanidae:

Varanus gouldii

One caught in February, two in April, five in August, four in November and two in December; mainly observed active in open woodland areas and around man-made structures. One adult caught in cage trap on northern side of Culeenup Is. in December.

Varanus tristis

An adult caught in mist net adjacent to *Melaleuca* thicket on Culeenup Is. in December 1985.

Typhlopidae:

Ramphotyphlops australis

One collected in February, two in April, five in August, four in November and two in December. Excavated from soil beneath decaying logs, man-made debris and also pit-trapped in open woodland and shrubland habitats.

Elapidae:

Notechis scutatus

Not recorded by us. There are intermittent sightings over the past 20 years in the delta system (Bruce and Ken Tatham, pers. comm.).

Pseudonaja affinis

Only two caught during survey. One adult excavated from an unused termite mound in open woodland on Culeenup Is. in April; a juvenile found beneath a decaying log next to Trapline 3 in August. A complete slough of this species was found beneath a piece of corrugated iron in November on Yunderup Is.

DISCUSSION

This survey recorded 11 mammal, five frog and 15 species of reptile. All are within their known range with the exception of *Neobatrachus pelobatoides* and *Varanus tristis*. The frog is near the western limit of its distribution on the coastal plain and is generally associated with clay or loam soils Tyler *et al.* (1984). According to Storr *et al.* (1983) *V. tristis* is found south to Perth, therefore this represents a minor southerly range extension.

The mammal assemblage has five native and six introduced species as is to be expected from the large scale changes to the habitat. The native mammal fauna was presumably more diverse in the past. Literature searches indicate the present or past occurrence of the following additional seven species on the adjacent coastal plain: Brush-tailed Wambenger *Phascogale tapoatafa*, Numbat *Myrmecobius fasciatus*, Pygmy Possum *Cercartetus concinnus*, Brush Wallaby *Macropus imma*, Quokka *Setonix brachyurus*, Honey Possum *Tarsipes spencerae* and Southern Bush Rat *Rattus fuscipes*. Possible reasons for their decline could be attributed to the isolation of the delta system, reduced vegetation cover, the increased presence of man with

development and agricultural activities and competition combined with predation by exotic species.

The Australian Sea Lion *Neophoca cinerea* and Bottle-nosed Dolphin *Tursiops truncatus* have been sighted infrequently in the Peel Inlet. It is known that the dolphin swims up the Murray River almost to Pinjarra (Serventy pers. notes). Taylor (1984) states that the Bottle-nosed Dolphin is more prevalent in warm shallow waters of bays and inlets and less frequent in open seas.

All of the recorded native mammals appear to be sparsely distributed in the delta. With suitable management of the delta islands two species could be assisted in their chances of survival. The cessation of further clearing on the islands or adjacent mainland and elimination of feral predators would benefit existing population of *Isoodon obesulus*. The protection of certain water channels (no boat traffic) would enhance the status of *Hydromys chrysogaster* in the area.

The survey commenced in summer and only a small number of frogs were represented in early catches. As the survey progressed into autumn and winter, numbers increased accordingly. All four species reached their peak activity towards the end of our survey (Figure 2). Although attempts were made to foresee the changes in the water table by placing traplines on high ground it became quite obvious during winter that some of our traplines would become inoperative. Only 20 per cent of the pit-traps were functional, therefore the numbers of frogs caught is not truly representative of their activity at that particular time. During our literature searches we found a single record of *Crinia georgiana* from 1972. We were unable to confirm the record by further specimens. During the last 20 years no great habitat changes on the islands have occurred, therefore that record might not relate to a population of the species on the islands. Rather an accidental introduction to this area by freshwater river flows from the Darling Scarp.

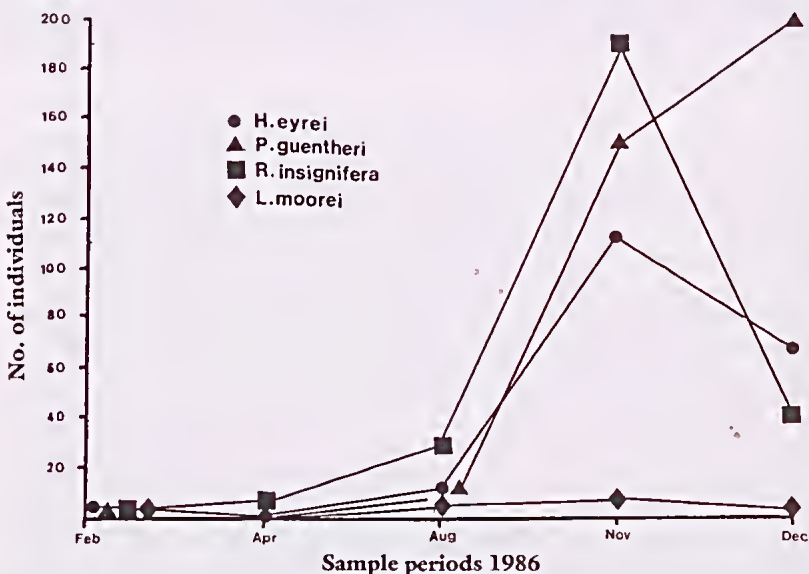


Figure 2. The seasonal abundance of frogs, *Heleioporus eyrei*, *Pseudophryne guentheri*, *Ranidella insignifera* and *Litoria moorei*, in the delta system.

Considering the abundance of *Limnodynastes dorsalis* on the coastal plain we were surprised not to encounter them during our work.

Reptiles are the main component of the terrestrial vertebrate fauna in the delta system. The Swan Coastal Plain has a relatively rich reptile fauna, although the results of this survey indicate a paucity in this study area when compared to Storr *et al.* (1978) who list 55 species for the northern Swan Coastal Plain. Serventy (1970) noted six species of reptiles occurring within the delta. A further 10 species were recorded during our survey. These are: *Phyllodactylus marmoratus*, *Aprasia repens*, *Lialis burtonis*, *Ctenotus impar*, *Leiolopisma tigris*, *Menetia greyii*, *Tiliqua rugosa*, *Varanus gouldii*, *Varanus tristis* and *Ramphotyphlops australis*. Excluding *V. tristis*, all species collected on this survey are widely distributed throughout the south west. The apparent absence of other common south-western species e.g. *Hemiergis quadrilineata* and *Morethia obscura* could be attributed to their inability to cope with seasonal inundations. The uniformity of the vegetation in the delta is another restricting factor affecting greater diversity. Annual flooding may account for the lack of fossorial types e.g. *Vermicella* spp.

Chelodina oblonga and *Notechis scutatus* have been seen in the area but were not recorded during this survey. However, past records indicate that the latter was not present in great numbers. Due to the activities pursued around the delta area (agistment, nurseries and hobby farming) their scarcity is easily explained. Records of *C. oblonga* show that they appear to be using the channels in winter because of the presence of freshwater and suitable food. We do not know where this turtle spends the summer period. Two possibilities exist: up river migration into fresher waters, or leaving the channel systems altogether to aestivate in the sandy soils of the delta islands.

Females of *Phyllodactylus marmoratus* and *Lialis burtonis* were gravid during the November and December surveys, and a number of gravid *Leiolopisma trilineatum* were found in December.

ACKNOWLEDGEMENTS

We are indebted to Otto Mueller and John Dell for their helpful assistance and support throughout this study. We are grateful to the Peter Rankin Trust Fund for Herpetology for financial assistance and to the Shire of Murray for encouragement to undertake the work. We thank David Algaba and Paul Heery for help in the field. We are also grateful to Bruce Tatham, Ken and Sue Tatham, Doreen Trainor and Robert Leiver for their generosity and comments on the local fauna.

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APPENDIX I

VEGETATION DESCRIPTIONS AT TRAPLINES

Vegetation structure is described according to Muir (1977). The colours of soil A horizons at traplines were described from Munsell soil colour cards (Munsell Colour Co. Inc., Baltimore, Maryland, 21218 U.S.A. 1954 Exhibition), and their texture from Northcote (1971).

TRAPLINE 1

Muir Code: Sr. VTi. Stratum 1: Mainly *Casuarina obesa* (2-3 metres) and *Acacia saligna* with scattered *Jacksonia furellata*.

Stratum 2: *Juncus pallidus* and *Isolepis nodosa* are dominant broken up by clusters of *Chasmanthe floribunda*.

Stratum 3: Scattered *Carpobrotus aequilaterus*.

Comments: Leaf litter — narrow leaves, accumulating. Concentrated beneath *C. obesa*. Depth: 15-20 mm. Scattered decaying logs, numerous fallen bark pieces on ground.

Soil: Yellowish brown — 10YR 5/6. Texture: Sand.

TRAPLINE 2

Muir Code: GLd. Stratum 1: 100% canopy cover consisting of exotic perennial grasses with some exotic annuals including *Lotus major*. Scattered *Chasmanthe floribunda*.

Comments: Leaf litter and surface debris absent.

Soil: Dark brown — 7.5YR 3/2 surface. Texture: Loamy sand. Brownish yellow — 10YR 6/6cm. depth. Texture: Sand.

TRAPLINE 3

Muir Code: Si. GLi. Stratum 1: The dominant species is *Jacksonia furcellata* with some *Acacia saligna* and *Melaleuca raphiophylla*.

Stratum 2: *Chasmanthe floribunda* and exotic grasses with scattered *Conostylis aculeata*.

Comments: Leaf litter — narrow leaves, very sparse. Litter depth not taken. Few decaying logs and very little bark on ground.

Soil: Light brownish grey — 10YR 6/2. Texture: Sand.

TRAPLINE 4

Muir Code: LAr. Sr. SDc. Stratum 1: *Eucalyptus nudis* (<10%).

Stratum 2: Dominants are *Jacksonia furcellata* and *Acacia saligna* with scattered *Macrozamia riedlei* and *Regelia* sp.

Stratum 3: *Conostylis aculeata* and *Chasmanthe floribunda* is abundant with emergent *Regelia* sp. regrowth.

Comments: Leaf litter — narrow to broad leaves, heavily concentrated beneath *E. nudis*. Depth: 40-50mm. Decaying logs and bark on ground are extensive.

Soil: Brown — 10YR 5/3. Texture: Sand.

TRAPLINE 5

Muir Code: LAr. Sr. SDc. Stratum 1: *Eucalyptus nudis* (<10%).

Stratum 2: *Jacksonia furcellata* and *Viminaria juncea* with scattered *E. nudis* saplings.

Stratum 3: Dominated by the sedge *Isolepis nodosa* with some *Juncus* sp. *Conostylis aculeata* and *Chasmanthe floribunda* are scattered.

Comments: Leaf litter — broad, very dense beneath *E. nudis*. Depth: 30-40mm. Some decaying logs with very little bark on ground. Soil: Light grey — 10YR 7/2. Texture: Sand.

TRAPLINE 6

Muir Code: Si. SDr. Stratum 1: Dominated by *Jacksonia stembergiana* with scattered *Acacia saligna*.

Stratum 2: *Conostylis aculeata* and exotic grasses.

Comments: Leaf litter — narrow, accumulating. Depth: 15-20mm.

Decaying logs and pieces of bark on ground sparse.

Soil: Pale brown — 10YR 6/3. Texture: Sand.

APPENDIX II

SPECIES CAUGHT AT TRAPLINES

| Species | Traplines | | | | | |
|--------------------------|-----------|----|----|----|----|----|
| | 1. | 2. | 3. | 4. | 5. | 6. |
| <i>I. obesulus</i> | X | | | | | |
| <i>M. musculus</i> | | X | X | X | X | |
| <i>R. rattus</i> | X | | | | | |
| <i>H. eyrei</i> | X | X | X | X | X | X |
| <i>N. pelobatoides</i> | | | | | | X |
| <i>P. guentheri</i> | | X | X | X | X | X |
| <i>R. insignifera</i> | X | X | X | X | X | X |
| <i>L. moorei</i> | | | | | X | X |
| <i>P. marmoratus</i> | | | | | | X |
| <i>L. burtonis</i> | X | | X | | X | X |
| <i>P. minor</i> | | X | | | | |
| <i>C. plagiocephalus</i> | X | | X | X | X | |
| <i>C. impar</i> | | | X | X | X | X |
| <i>L. trilineatum</i> | X | X | X | X | X | X |
| <i>L. elegans</i> | | | | X | | |
| <i>M. greyii</i> | X | X | X | X | X | X |
| <i>T. rugosa</i> | | | X | X | X | |
| <i>R. australis</i> | | | | | X | X |
| Total: | 8 | 7 | 10 | 10 | 12 | 11 |

APPENDIX III

SPECIES RECORDED ON ISLANDS

| Species | Islands | | | | | | | | |
|--------------------------|---------|------|------|------|--------|------|------|-------|--|
| | C.I. | J.I. | M.I. | Y.I. | L.Y.I. | B.I. | W.I. | Je.I. | |
| <i>M. fuliginosus</i> | X | E | | E | | E | | | |
| <i>T. vulpecula</i> | E | | | | | | | | |
| <i>I. obesulus</i> | X | | | | | | | | |
| <i>H. chrysogaster</i> | X | | | | | | | | |
| <i>T. australis</i> | X | X | | | | | | | |
| <i>M. musculus</i> | X | X | E | X | | | | | |
| <i>R. rattus</i> | X | | | | | | | | |
| <i>O. cuniculus</i> | X | E | E | E | E | E | E | E | |
| <i>O. aries</i> | X | | | | | | | | |
| <i>F. catus</i> | X | X | | | | | | | |
| <i>V. vulpes</i> | X | E | E | E | E | E | E | X | |
| <i>H. eyrei</i> | X | X | X | | | | | | |
| <i>N. pelobatoides</i> | X | | | | | | | | |
| <i>P. guentheri</i> | X | X | | | | | | | |
| <i>R. insignifera</i> | X | X | | | | X | | | |
| <i>L. moorei</i> | X | X | | | | X | | | |
| <i>P. marmoratus</i> | X | | | X | | X | | | |
| <i>A. repens</i> | | X | | X | | X | | | |
| <i>L. burtonis</i> | X | X | | | | | X | | |
| <i>P. minor</i> | X | | | | | | | | |
| <i>C. plagiocephalus</i> | X | X | X | X | X | X | X | X | |
| <i>C. impar</i> | X | X | | | | | X | | |
| <i>E. kingii</i> | X | X | X | X | X | X | X | X | |
| <i>L. trilineatum</i> | X | X | X | X | | X | X | | |
| <i>L. elegans</i> | X | X | | | | | | | |
| <i>M. greyii</i> | X | X | X | X | | | X | | |
| <i>T. rugosa</i> | X | X | X | X | | | X | | |
| <i>V. gouldii</i> | X | X | | | | X | | | |
| <i>V. tristis</i> | X | | | | | | | | |
| <i>R. australis</i> | X | X | X | X | | | | | |
| <i>P. affinis</i> | X | | | E | | | | | |

Culeenup Is., Jeegarnyeejip Is., Meeyip Is., Yunderup Is., Little Yunderup Is., Ballee Is., Worallgarook Is. and Jennala Is.

E: Evidence.